Space Weather Forecast

Issued on Friday, 08 December 2023 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate-class flares (R1-R2 Blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low with only Common class flares over the past 24 hours, the largest of which originated from a region in the northeast which is moderately sized and moderately magnetically complex. Two other moderately large regions on the disc reside in the southwest. These form part of a complex of groups in this area, with magnetic connection between these regions. A region on the northwest is also of note, with a north-south magnetic alignment, perhaps increasing instability. The other regions on the disc appear mostly smaller and simpler at present.

A number of coronal mass ejections (CMEs) have been evident in coronagraph imagery during the past 24 hours. Although none are currently deemed to have any Earth-directed component, further imagery and analysis is required to confirm this.

Solar Wind / Geomagnetic Activity: Solar winds parameters show an ongoing but waning fast wind from a coronal hole. Wind speeds were briefly elevated but have predominantly been at slightly elevated levels. The Interplanetary Magnetic Field has been weak. The important north-south component has varied weakly. Geomagnetic activity was Quiet (Kp0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate with a chance of isolated Moderate-class flares, mainly from the region in the northeast, but perhaps also from the regions in the western hemisphere.

Solar Winds / Geomagnetic Activity: No Earth directed CMEs currently feature in the forecast, beyond a low confidence glancing blow on Day 3 (10 Dec). Solar winds are currently at slightly elevated levels due to waning effects from a coronal hole fast wind. Solar winds are expected to continue to gradually decline through the coming days, remaining slightly elevated on Day 1 (8 Dec) then reaching background levels during Day 2 (9 Dec). On Day 3, the high speed stream (HSS) from a new coronal hole is expected to arrive, with speeds increasing to, or close to, elevated levels. The HSS influence likely continuing on Day 4 (11 Dec).

Geomagnetic activity is expected to be largely Quiet (Kp0-2) with a chance of isolated Unsettled intervals (Kp3) until later Day 3, when the arrival of a coronal hole HSS should bring Unsettled to Active (Kp3-4) periods with a slight chance of a G1/Minor Geomagnetic Storm interval (Kp5). Activity is expected to decline back to Quiet/Unsettled levels (Kp1-3) later Day 4.

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background levels, with no solar radiation storms expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	20	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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